

WHAT IS CLAIMED IS:

1. A data processing method for compressing vertex coordinate data of a plurality of polygons approximating a three-dimensional shape of an image, comprising:

a first step of dividing vertexes of said plurality of polygons approximating said three-dimensional shape of said image into a plurality of vertex sets;

a second step of determining a reference point for each of said vertex sets;

a third step of obtaining differential data between coordinates of each vertex and coordinates of a corresponding reference point as positional information of said vertex, for each of said vertex sets; and

a fourth step of storing coordinate data of said reference point and said differential data as compressed data in each of said vertex sets.

2. A data processing method according to Claim 1, wherein said coordinates of said vertexes and said coordinates of said reference point are provided as floating point data, and in said differential data obtained in said third step, a difference between coordinates of each vertex and coordinates of a corresponding reference point for each of said vertex sets is obtained as an integer value showing magnitude relative to a predetermined scale value.

3. A data processing method according to Claim

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1, wherein in said second step, for each of said vertex sets, a vertex close to a barycentric point obtained from coordinates of respective vertexes of said vertex set, or said barycentric point itself is set as a reference point for said vertex set.

4. A data processing method according to Claim 2, wherein in said second step, for each of said vertex sets, a vertex close to a barycentric point obtained from coordinates of respective vertexes of said vertex set, or said barycentric point itself is set as a reference point for said vertex set.

5. A recording medium for recording image data readable by a computer, wherein:

said image data has coordinate data of a reference point for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, and differential data between coordinates of each of said vertexes and coordinates of said reference point.

6. A recording medium according to Claim 5, wherein said coordinate data of said reference point is floating point data, and said differential data is integer value data showing magnitude relative to a predetermined scale value.

7. A recording medium according to Claim 5, wherein said reference point is a barycentric point obtained from said coordinates of said vertexes contained in said set of vertexes of said plurality of

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8. A recording medium according to Claim 6, wherein said reference point is a barycentric point obtained from said coordinates of said vertexes contained in said set of vertexes of said plurality of polygons, or a vertex close to said barycentric point.

a first step of inputting coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, differential data of a difference between coordinates of each of said vertexes and coordinates of said reference point in a type of integer, and scale value data for providing a reference of magnitude of said differential data in a type of floating point number;

a third step of multiplying said type-converted differential data by said scale value data; and

10. A data processing apparatus comprising:

storage means which can store coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons

approximating a three-dimensional shape of an image, differential data of a difference between coordinates of each of said vertexes and coordinates of said reference point in a type of integer, and scale value data for providing a reference of magnitude of said differential data in a type of floating point number; and

operation control means for receiving said differential data read out from said storage means, type-converting said received differential data into floating point numbers, multiplying said type-converted differential data by said scale value data, and outputting a multiplication result as expanded differential data.

11. A data processing apparatus according to Claim 10, wherein said operation control means is a CPU, said CPU being able to execute an instruction to type-convert integer data into floating point number data, said instruction of type-conversion having a bit-length information field indicating bit length of said integer data.

12. A data processing method comprising the steps of:

inputting coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, and differential data of a difference between coordinates of each of

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said vertexes and coordinates of said reference point in a type of floating point number; and

carrying out affine transformation upon said inputted coordinate data of said reference point while linear transformation in which parallel displacement is excluded from said affine transformation is carried out upon coordinate data of said vertexes sharing said reference point.

13. A recording medium for recording a program readable by a computer, wherein:

said program makes said computer input coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, and differential data of a difference between coordinates of each of said vertexes and coordinates of said reference point in a type of floating point number; and said program makes said computer carry out affine transformation upon said inputted coordinate data of said reference point while linear transformation in which parallel displacement has been excluded from said affine transformation is carried out upon coordinate data of said vertexes sharing said reference point.

14. A data processing apparatus comprising:

storage means which can store coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons

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operation means for carrying out affine transformation upon said coordinate data of said reference point read out from said storage means while linear transformation in which parallel displacement is excluded from said affine transformation is carried out upon coordinate data of said vertexes sharing said reference point.

inputting coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, and differential data of a difference between coordinates of each of said vertexes and coordinates of said reference point in a type of floating point number; and

perspective transformation based on division using a geometric relationship of similarity is carried out upon said reference point so as to obtain perspective-transformed coordinate data of said

reference point; and

perspective-transformed coordinate data of said vertexes other than said reference point is obtained by use of said perspective-transformed coordinate data of said reference point, and said differential data corresponding thereto in accordance with approximate calculation based on Maclaurin series expansion.

16. A data processing method according to Claim 15, wherein in said approximate calculation for said perspective transformation, perspective transformation based on division using a geometric relationship of similarity is carried out upon said coordinate data of said vertexes other than said reference point when a distance between a coordinate origin and a perspective plane for said perspective transformation is smaller than a predetermined value.

17. A recording medium for recording a program readable by a computer, wherein:

said program makes said computer input coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, and differential data of a difference between coordinates of each of said vertexes and coordinates of said reference point in a type of floating point number; and said program makes said computer carry out perspective transformation upon said

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vertexes of said plurality of polygons in such a manner that perspective transformation based on division using a geometric relationship of similarity is carried out upon said inputted coordinate data of said reference point so as to obtain perspective-transformed coordinate data of said reference point, while approximate calculation for said perspective transformation is carried out upon said inputted coordinate data of said vertexes other than said reference point on the basis of Maclaurin series expansion using said perspective-transformed coordinate data of said reference point so as to obtain perspective-transformed coordinate data of said vertexes.

18.           A data processing apparatus comprising:  
                storage means which can store coordinate data of a reference point in a type of floating point number for a set of vertexes of a plurality of polygons approximating a three-dimensional shape of an image, and differential data of a difference between coordinates of each of said vertexes and coordinates of said reference point in a type of floating point number; and

                operation means for carrying out perspective transformation upon said vertexes of said plurality of polygons in such a manner that perspective transformation based on division using a geometric relationship of similarity is carried out upon said coordinates of said reference point stored in said storage means so as

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to obtain perspective-transformed coordinate data of said reference point, while approximate calculation for said perspective transformation is carried out upon said coordinate data of said vertexes other than said reference point stored in said storage means on the basis of Maclaurin series expansion using said perspective-transformed coordinate data of said reference point so as to obtain perspective-transformed coordinate data of said vertexes when a distance between a perspective plane for said perspective transformation and said reference point is larger than a predetermined value, or while perspective transformation based on division using a geometric relationship of similarity is also carried out upon said coordinate data of said vertexes other than said reference point stored in said storage means so as to obtain perspective-transformed coordinate data of said vertexes when said distance between said perspective plane for said perspective transformation and said reference point is smaller than said predetermined value.

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